AIR HANDLING UNIT (AHU) SCHEDULE

TAG	MAX SUPPLY AIR (CFM)	MIN OA (CFM)	SUPPLY FAN							COOLING COIL SECTION				REHEAT COIL SECTION				FILTER DATA		BASIS OF DESIGN		NOTES
			MAX FAN SPEED (RPM)	EXT SP (IN WG)	APPROX. MTR HP	VOLTS/ PHASE/ HERTZ	DISCONNECT BY	STARTER BY	STARTER TYPE	CAPACITY TOT (MBH)	CAPACITY SENSIBLE (MBH)	EAT DB / WB (°F)	LAT DB / WB (°F)	CAP (MBH)	EAT/ LAT (°F DB)	WATER TEMP ENT/LVG (°F)	FLOW (GPM)	PRE-FILTER EFF	PRIMARY FILTER EFF	MANUF	MODEL	
AHU-1	3600	404	2155	0.5	3	480/3/60	MC	MC	COMBO	99	79	76.4 / 62.5	55 / 55	79	62.5 / 84.5	180 / 160	7.9	MERV-8	MERV-13	TRANE	UCCA	1
AHU-2	1000	105	2588	0.5	3	480/3/60	MC	MC	COMBO	30	24	75.4 / 62.4	55 / 55	19	63.5 / 80.5	180 / 160	1.9	MERV-8	MERV-13	TRANE	UCCA	1

NOTES: 1. INSTALL UNIT FOR PROPER CONDENSATE DRAINAGE. COORDINATE ANY SPECIAL REQUIREMENTS WITH GC.

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FAN SCHEDULE

TAG	SERVICE	AREA SERVED	FAN TYPE	DRIVE TYPE	CFM	S.P. (IN. W.G.)	MOTOR DATA					SONES	BASIS OF DESIGN		NOTES
							APPROX. MOTOR SIZE	RPM	VOLTS/ PHASE/ HERTZ	DISCONNECT BY	STARTER BY		MANUF.	MODEL	
EF-1	EXHAUST	1000 - TOILET	CENTRIFUGAL INLINE	BELT	105	0.25	250 W	1725	120/1/60	MC	MC	8.1	GREEN HECK	SP	2
EF-2	EXHAUST	1000 B - BATTERY CHARGING	CENTRIFUGAL INLINE	BELT	600	0.25	1/2 HP	1725	120/1/60	MC	MC	12.4	GREEN HECK	SQ	1

NOTES: 1. FAN CONTROL TO BE PART OF BATTERY CHARGING SYSTEM.
2. FAN CONTROL SHALL ACTIVATE FAN DURING BUILDING OCCUPIED HOURS.

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SPLIT DX HEAT PUMP / AIR CONDITIONING UNIT SCHEDULE (ACU & ACCU)

INDOOR UNIT										MATCHED OUTDOOR UNIT						BASIS OF DESIGN		NOTES
TAG	SPACE SERVED	SUPPLY AIR FLOW (CFM)	MIN OA (CFM)	RATED COOLING CAPACITY TOTAL COOLING (MBH)	HEATING CAPACITY (MBH)	MCA	VOLT/ PHASE/ HERTZ	DISCONNECT	STARTER	TAG	VOLT/ PHASE/ HERTZ	MCA	MFS	DISCONNECT	STARTER	MANUF	MODEL (ACU / ACCU)	
ACU-3	1002 - IT	479	0	18	12.6	0.18	208/1/60	BY MC	BY MC	ACCU-3	208/1/60	14.1	20	BY MC	BY MC	DAIKIN	FTXS18DVJU, RX18FVJU	1, 2, 3, 4, 5
ACU-4	1002 - IT	479	0	18	**12.6**	0.18	208/1/60	BY MC	BY MC	ACCU-4	208/1/60	14.10	20	BY MC	BY MC	DAIKIN	FTXS18DVJU, RX18FVJU	1, 2, 3, 4, 5

NOTES: 1. PROVIDE WITH MANUFACTURER SUPPLIED INTEGRAL CONDENSATE PUMP,
2. PROVIDE WITH INDOOR AND OUTDOOR COMPONENTS FULLY CHARGED WITH R-410A REFRIGRANT AND INTERCONNECTING REFRIGERANT PIPING FOR FIELD INSTALLATION.
3. PROVIDE WITH MANUFACTURER'S STANDARD REMOTE CONTROLLER.
4. HEATING CAPCACITY INDICATED BASED ON 42° OUTDOOR TEMP AND 70° INDOOR DB TEMP.
5. PROVIDE OUTDOOR UNIT WITH HAIL GUARD.

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VARIABLE AIR VOLUME (VAV) BOX SCHEDULE

TAG	COOLING CFM		INLET DUCT SIZE (DIA)	REHEAT COIL DATA					MAX. WPD (FT H2O)	NOTES
	MAX	MIN		MBH	GPM	COIL	HW TEMP (°F) EWT	HW TEMP (°F) LWT		
VAV-162	900	225	9"	5.0	0.5	1	120	100	10	1 - 6
VAV-162AB	175	50	4"	1.1	0.1	1	120	100	10	1 - 6
VAV162E	530	105	7"	2.3	0.2	1	120	100	10	1 - 6
VAV162S	795	170	9"	3.7	0.4	1	120	100	10	1 - 6
VAV-200	100	50	4"	1.1	0.1	1	120	100	10	1 - 6
VAV-201	200	50	4"	1.1	0.1	1	120	100	10	1 - 6

NOTES: 1. BASIS OF DESIGN -- MANUFACTURER: PRICE; MODEL: SDV, SINGLE DUCT WITH HOT WATER HEATING COIL.
2. DDC CONTROLLER WITH 2-WAY MODULATING HOT WATER CONTROL VALVE.
3. HOT WATER COIL PERFORMANCE DATA IS BASED ON LISTED EWT & LWT - MFG TO PROVIDE SPECIFIC COIL PARAMETERS (FPI, ETC.) TO MEET ALL REQUIRED PERFORMANCE CRITERIA.
4. MAXIMUM ALLOWABLE STATIC PRESSURE LOSS ACROSS BOX + COIL ASSEMBLY = 0.6 INCHES WATER GAUGE.
5. MAXIMUM DISCHARGE EXTERNAL STATIC PRESSURE DOWNSTREAM OF VAV BOXES = 0.5 INCHES WATER GAUGE.
6. MAXIMUM ALLOWABLE DISCHARGE OR RADIATED NOISE CRITERIA (NC) = 20

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BID OPTION (TYP.)

GRILLE, REGISTER, AND DIFFUSER (GRD) SCHEDULE

TAG	SERVICE	TYPE	SIZE (INCHES) FACE	SIZE (INCHES) NECK	MOUNT	MAX NC	BASIS OF DESIGN MANUF	BASIS OF DESIGN MODEL	NOTES
A	SUPPLY	REGISTER	24x8	-	DUCT	35	PRICE	720	1,3
B	SUPPLY	DIFFUSER	24" DIA	8" DIA	DUCT	25	PRICE	RCDE	1
C	SUPPLY	DIFFUSER	24x24	8" DIA	CEILING	20	PRICE	SCDA	1
D	SUPPLY	REGISTER	6x6	-	WALL	30	PRICE	720	1
E	RETURN	REGISTER	6x6	-	WALL	30	PRICE	720	1
F	RETURN	REGISTER	6x6	-	WALL	20	PRICE	720	1
G	RETURN	REGISTER	24x8	-	DUCT	20	PRICE	720	1,3
H	RETURN	GRILLE	24x24	12x12	CEILING	20	PRICE	60	2
X	SUPPLY/RETURN	EXISTING	-	-	-	-	-	-	1

NOTES: 1. REFER TO DRAWINGS FOR ACTUAL AIR BALANCE QUANTITIES IN SPECIFIC LOCATIONS.
2. RETURN GRILLE SHALL BE SUPPLIED WITH 24x24" PANEL FRAME FOR LAY-IN MOUNTING IN T-BAR SUSPENDED CEILING.
3. PROVIDE WITH BORDER/FRAME ASSEMBLY SPECIFICALLY DESIGNED FOR MOUNTING ON END OF EXPOSED DUCT; FRAME SHALL "HEM" THE RAW EDGE OF THE DUCT. BRANCH TAKE-OFF SHALL BE SIZED TO ACCOMMODATE THE CORE AREA OF THIS BORDER STYLE AND INCLUDE AN OPPOSED BLADE MANUAL BALANCING DAMPER.

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LOUVER (L) SCHEDULE

TAG	SIZE WxH (IN)	DESIGN CFM	MAX PRESSURE DROP (IN WG)	BASIS OF DESIGN MANUF	BASIS OF DESIGN MODEL	NOTES
L-1	36Xx36	3600	0.1	AWV	LE-31	
L-2	36X24	600	0.1	AWV	LE-31	
L-3	36X24	1200	0.1	AWV	LE-31	
L-4	36X24	1200	0.1	AWV	LE-31	
L-5	36X24	1200	0.1	AWV	LE-31	
L-6	36X24	1000	0.1	AWV	LE-31	
L-7	36X24	1000	0.1	AWV	LE-31	
L-8	36X24	105	0.1	AWV	LE-31	

NOTES:

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AIR CURTAIN (AC) SCHEDULE

TAG		AREA SERVED	LENGTH	AIRFLOW @ NOZZLE CFM	AVERAGE VELOCITY @ NOZZLE CFM	SOUND @ 10' FROM NOZZLE DBA	MOTOR DATA VOLT/ PHASE/ HERTZ	MOTOR DATA APPROX. MOTOR SIZE HP	BASIS OF DESIGN MANUF	BASIS OF DESIGN MODEL	NOTES
AC-1	2	1000B - WAREHOUSE STORAGE	10'-0"	14,650	3400	73	480/3/60	5	MARS	BD-14-120	1-5

1 DELETED

NOTES: 1. UNHEATED TYPE MODEL
2. PROVIDE WITH 16 GA. PAINTED CABINET.
3. SWITCH TO BE MOUNTED SUCH THAT UNIT OPERATES WHENEVER DOOR IS OPENED.
4. SUPPLY COMPLETE WITH WATERTIGHT JUNCTION BOX MOUNTED ON BOTTOM CENTER OF MOTOR ASSEMBLY.
5. PROVIDE WITH MANUAL MOTOR STARTER AND DISCONNECT.

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AIR COOLED CONDENSING UNIT (ACCU) / HEAT PUMP SCHEDULE

TAG	CAPACITY (MBH)	AMBIENT (°F)	MCA	VOLTAGE	MANUF.	MODEL	NOTES
ACCU-1	94	95	13	480/3/60	TRANE	TWA090D	1
ACCU-2	30	95	7	480/3/60	TRANE	4TWA30	1

NOTES :
1. PROVIDE WITH HAIL GUARD

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AIR HANDLING UNITS: AHU-1 AND AHU-2

GENERAL
CONTROLS SHALL BE AN EXTENSION OF EXISTING SYSTEM. PROVIDE SENSORS, ACTUATORS, CONTROLLERS, PROGRAMMING, ETC. TO ACHIEVE THE DESCRIBED SEQUENCES.

OCCUPIED MODE:
SUPPLY FAN
THE SUPPLY FAN WILL BE STARTED AND SHALL RUN CONTINUOUSLY. IF THE SUPPLY FAN STATUS DOES NOT MATCH THE COMMANDED VALUE, AN ALARM WILL BE GENERATED. WHEN THE SUPPLY FAN STATUS INDICATES THE FAN STARTED, THE FOLLOWING CONTROL SEQUENCES WILL BE ENABLED.

ZONE CONTROL
THE MIXED AIR DAMPERS, HYDRONIC SUPPLEMENTAL HEATING, AND THE COMPRESSOR WILL MODULATE/CYCLE IN SEQUENCE TO MAINTAIN THE ZONE TEMPERATURE AT SETPOINT.

HEAT PUMP CONTROL
WHEN THE ZONE TEMPERATURE FALLS BELOW THE ZONE TEMPERATURE SETPOINT THE REVERSING VALVE(S) WILL BE INDEXED TO PROVIDE HEATING WHEN THE COMPRESSOR IS RUNNING. UPON A FALL IN TEMPERATURE BELOW SETPOINT WITH THE HEAT PUMP AT FULL CAPACITY, THE HOT WATER VALVE SHALL BE MODULATED OPEN. WHEN THE ZONE TEMPERATURE RISES ABOVE THE ZONE TEMPERATURE SETPOINT THE REVERSING VALVE(S) WILL BE INDEXED TO PROVIDE COOLING WHEN THE COMPRESSOR IS RUNNING.

ECONOMIZER SWITCHOVER
WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW THE SWITCHOVER SETPOINT, THE ECONOMIZER WILL BE ENABLED. WHEN THE OUTSIDE AIR TEMPERATURE RISES ABOVE THE SWITCHOVER SETPOINT PLUS A DIFFERENTIAL, THE ECONOMIZER WILL BE DISABLED. SENSORS SHALL BE COMPARATIVE ENTHALPY TYPE.

DEHUMIDIFICATION
ON A RISE IN RELATIVE HUMIDITY ABOVE SETPOINT, THE DX COOLING WILL CYCLE ON TO MAINTAIN THE DEHUMIDIFICATION SETPOINT. THE HOT WATER REHEAT CONTROL VALVE WILL BE MODULATED TO MAINTAIN THE ZONE TEMPERATURE AT SETPOINT.

MIXED AIR LOW LIMIT OVERRIDE
THE MIXED AIR TEMPERATURE WILL OVERRIDE THE MINIMUM POSITION AND CLOSE THE OUTSIDE AIR DAMPER IF A TEMPERATURE IS SENSED BELOW THE SETPOINT.

DEWPOINT TEMPERATURE CONTROL
SYSTEM DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET AUTOMATICALLY TO MAINTAIN A POSITIVE DIFFERENTIAL (2 DEG. F, ADJ.) BETWEEN SPACE TEMPERATURE DEWPOINT AND DISCHARGE AIR TO PREVENT CONDENSATION ON SUPPLY AIR DUCTS.

UNOCCUPIED MODE:
WHEN IN "UNOCCUPIED" MODE, THE UNIT WILL CYCLE AS NECESSARY TO MAINTAIN THE NIGHT SETBACK ZONE TEMPERATURE AT SETPOINT. A DIFFERENTIAL (2 DEG F, ADJ.) SHALL BE PROVIDED TO PREVENT THE UNIT FROM CYCLING EXCESSIVELY. RETURN AIR DAMPER SHALL BE OPEN AND OUTDOOR AIR DAMPER SHALL REMAIN CLOSED.

SHUTDOWN
WHEN THE UNIT IS SHUTDOWN BY EITHER A STOP COMMAND, ATFP SHUTDOWN SIGNAL OR SYSTEM SAFETY THE UNIT WILL BE SET AS FOLLOWS:
SUPPLY FAN WILL BE OFF
OUTSIDE AIR DAMPER WILL CLOSE
RETURN AIR DAMPER WILL OPEN
HEATING VALVE WILL CLOSE
COMPRESSORS(S) WILL BE OFF

ATFP HVAC SHUTDOWN
UNIT SHALL BE INTERLOCKED WITH THE EXISTING SYSTEM. SYSTEM SHALL FOLLOW "SHUTDOWN" SEQUENCE EXCEPT ALL DAMPERS SHALL CLOSE.

SAFETY
ALL OF THE SAFETY DEVICES ARE MANUAL RESET; THE DEVICE THAT HAS TRIPPED MUST BE MANUALLY RESET BEFORE RESTARTING THE AIR HANDLING UNIT. IF A TEMPERATURE LOW LIMIT SWITCH SENSES A TEMPERATURE BELOW SETPOINT, THE SHUTDOWN SEQUENCE SHALL BE INITIATED EXCEPT THE HEATING VALVE AND THE RETURN AIR DAMPER SHALL OPEN. UPON A FIRE ALARM SHUTDOWN, THE SHUTDOWN SEQUENCE SHALL BE INITIATED.

INTERLOCKS
WHEN AIR HANDLER AHU-1 IS IN OCCUPIED MODE, EF-2 SHALL BE ENABLED, L-1 AND L-2 DAMPERS SHALL OPEN. WHEN AIR HANDLER AHU-1 IS IN ECONOMIZER MODE, L-3, L-4 AND L-5 DAMPERS SHALL OPEN.
WHEN AIR HANDLER AHU-2 IS IN OCCUPIED MODE, EXHAUST FAN EF-1 SHALL ENABLE, L-6 AND L-8 DAMPERS SHALL OPEN. WHEN AIR HANDLER AHU-2 IS IN ECONOMIZER MODE, L-7 DAMPER SHALL OPEN.

BATTERY EXHAUST FAN EF-2

GENERAL
CONTROLS SHALL BE AN EXTENSION OF EXISTING SYSTEM. PROVIDE SENSORS, ACTUATORS, CONTROLLERS, PROGRAMMING, ETC. TO ACHIEVE THE DESCRIBED SEQUENCES.

EXHAUST FAN
IN OCCUPIED MODE, FAN SHALL RUN CONTINUOUSLY, L-2 DAMPER SHALL OPEN.
IN UNOCCUPIED MODE, UPON SENSING CURRENT TO BATTERY CHARGING STATION, FAN SHALL ENERGIZE AND L-2 DAMPER SHALL OPEN.

HYDROGEN GAS DETECTOR
BATTERY CHARGING AREA A HYDROGEN (H2) GAS DETECTION SYSTEM (SBS-H2 HYDROGEN MONITORING SYSTEM OR EQUAL) SHALL BE INSTALLED IN THE BATTERY CHARGING AREA CONSISTING OF A WALL MOUNTED CONTROLLER WITH AUDIBLE AND VISIBLE ALARMS AND RELAYS FOR REMOTE ALARM AND SYSTEM CONTROL. THE HYDROGEN (H2) SENSOR SHALL BE LOCATED WITHIN THE SPACE NEAR THE ROOF LEVEL DIRECTLY ABOVE THE CHARGING STATION.

UPON DETECTION OF H2 LEVELS AT 1% LEVEL (WARNING LEVEL) THE H2 SYSTEM CONTROLLER SHALL INDICATE A YELLOW WARNING SIGNAL AND A WARNING RELAY SIGNAL SHALL BE SENT TO THE DDC SYSTEM TO INITIATE OPERATION OF THE EXHAUST FAN, AND TO DISABLE POWER TO THE BATTERY CHARGING SYSTEM. UPON DETECTION OF H2 LEVELS AT 2% LEVEL (ALARM LEVEL) THE H2 SYSTEM CONTROLLER SHALL INDICATE A RED WARNING SIGNAL COUPLED WITH AN AUDIBLE ALARM. AN ALARM RELAY SIGNAL SHALL BE SENT TO THE FIRE ALARM SYSTEM AND THE AHU-1 SYSTEM SHALL OPERATE PER THE OCCUPIED SEQUENCE.

US Army Corps of Engineers

REGISTERED PROFESSIONAL ENGINEER DAVID A. WARD No. 061160 COMMONWEALTH OF PENNSYLVANIA

NO.	DESCRIPTION	DATE
1	SCHEDULE CLARIFICATIONS	08/29/16

DATE: 07/29/2016
SOLICITATION NO: IFB W91ZBU-16-B-0030
CONTRACT NO:
FILE NUMBER: 134589
DESIGNED BY: DESH
DRAWN BY: AJK
CHKD BY: DWRD
SUBMITTED BY:
PLOT DATE:
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PLOT SCALE: AS NOTED
PLOT STYLE TABLE: ARCH E1

U.S. ARMY CORPS OF ENGINEERS
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MICHAEL BAKER JR. INC.
100 AIRSIDE DRIVE
MOON TOWNSHIP, PA 15108

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DOVER AIR FORCE BASE, DOVER DELAWARE
ARMED FORCES MEDICAL EXAMINER SYSTEM FACILITY
MECHANICAL - SCHEDULES

SHEET IDENTIFICATION
M-600
SHEET 40 OF 50

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